

Facilitator's Summary Report

California Ocean Science Trust

Planning Workshop

August 26 – 27
Santa Barbara, CA

Submitted by:
Brock B. Bernstein, Ph.D.
308 Raymond St., Ojai, CA 93023
(805) 646-8369; brockbernstein@sbcglobal.net

Introduction

This brief report summarizes the results of a planning workshop organized for the Board of Trustees (Board) of the California Ocean Science Trust (Trust). The purpose of the workshop was to help inform the Board about critical ocean and coastal issues and to identify necessary research and monitoring efforts needed to support the management of those issues. The Board will then use this information in the development of a strategic plan that will guide the Trust's future efforts.

Workshop Format

The first day of the workshop was organized around a series of panel discussions (Appendix 1) that focused on four key issue areas. During each two-hour panel discussion, panelists addressed two questions:

- What are the two or three short- and long-term management-related research priorities in this area?
- What should be the role of the Trust in addressing these priorities?

Responses by each panelist to these questions were followed by a moderated discussion among the panelists, Board members, and the audience, which consisted primarily of members of other panels.

On the morning of the second day, the Board reviewed the information presented in the panel discussions, identified major themes, and developed the framework of a strategic plan and a process for fleshing it out more fully.

Panel Discussions

The following subsections summarize the suggested short- and long-term research needs identified by each panel as well as the central themes that arose through the subsequent discussion. The final subsection presents the moderator's overall perspective on the panel discussions.

Shoreline erosion and sediment transport

Major themes

Key themes that arose through the discussion and that serve to organize the specific research recommendations include the need to:

- Conduct statewide assessments of sediment budgets and deficits
- Develop the ability to monitor and manage on larger spatial scales that better match those of littoral cells
- Link coastal planning with processes and actions (e.g., dams, debris basins, channelization) upstream in watersheds that affect the coastal sediment budget
- Assess broader ecosystem impacts of beach nourishment projects and design such projects to minimize such impacts.

Short-term research needs

The individual panelists identified a number of short-term research needs. In general, these reflected an interest in developing assessment, modeling, and monitoring systems and tools that

would better integrate across larger spatial and temporal scales and across existing management and scientific boundaries. Specific suggestions focused on improving the planning and implementation of replenishment projects and on monitoring and assessing their results, and included:

- Developing a statewide inventory of the size of sediment deficits, especially at the scale of littoral cells. This would require, in part, a more systematic inventory of the amount of sediment currently on beaches. Such an inventory is being done to some extent now in Doug Inman's group at the Scripps Institution of Oceanography
- Identifying and characterizing sources of replacement sands, which include:
 - o degraded coastal lagoons that are filling with beach sands. These currently cannot be harvested because of the 4:1 mitigation requirement. Harvesting of beach sand could be promoted if this mitigation requirement were eased when sand harvesting simply changes one viable habitat type to another
 - o inland dams; most sands are on the foreset delta where the river enters the reservoir and could easily be harvested
 - o ancient streams and lagoons offshore, for example, along a wavecut terrace at 60m depth. Developing an inventory of this source would require more extensive sub bottom profiling
- Developing improved modeling and analytical tools to better design individual projects, e.g., by extending existing design rules of thumb to a wider range of sites, and making proprietary modeling tools more widely available
- Extending existing nearshore wave forecasting models to the beach itself in order to better predict wave surge impacts on the coastline
- Improving our understanding of the biological responses to natural and human coastal processes and actions. Inadequate understanding often leads to project denial or extreme monitoring requirements. In addition, there is a need for more science-based regulatory thresholds for fine sediments, which cause most of the biological responses
- Extending sediment budgets to include fine sediments. Budgets currently focus primarily on sand-sized particles, which make up only about 10% of the natural sediment influx
- Developing better long-term cost-benefit models of beach nourishment projects, that include biological effects, economic impacts, and social issues
- Improving the ability to track local sediment budgets so that jurisdictions can become more directly involved in beach restoration planning and maintenance
- Conducting additional site-specific monitoring to assess the results of individual projects and feed that learning back into models and design criteria. Such monitoring should investigate the use of continuous monitoring tools
- Developing a systematic, coordinated monitoring system statewide, with comparable methods and data formats, as opposed to current monitoring requirements which are site by site and uncoordinated
- Improving public understanding of coastal sediment processes by updating the movie River of Sand.

Longer-term research needs

The individual panelists also identified longer-term research needs. These were fewer in number than the short-term research needs, and included:

- Expanding research, monitoring, and management to the scale of littoral cells, based in part on the knowledge that the larger projects are, relative to the scale of the littoral cell, the more effective they are
- Integrating beach restoration planning with watershed planning, restoration, and management, including assessments of the impacts of upstream features such as debris basins

and channelization on sediment budgets. For example, hardened channels can lead to excess energy and more downstream erosion

- Improving understanding of how coastal structures function with respect to sediment processes
- Estimating the effects of global sea level rise on sediment budgets and deficits, in order to assess how much additional sand will be needed to retain beach width over the long term
- Identifying and evaluating options for working with water users and suppliers to move sediment through the water storage and distribution system to the beach, based on the observation that water and sand tend to move together
- Developing a statewide policy toward beach erosion, choosing, for example, to manage for ongoing nourishment vs. a planned retreat; FEMA studies might be a place to start

The role of the Trust

Panel members suggested several specific actions the Trust could take to further these research objectives and improve management related to the shoreline erosion issue. These focused primarily on broadening the spatial and temporal scope of management actions and improving their overall integration. Specific suggestions included:

- Identifying key information gaps
- Ensuring that a broader assessment of economic issues is a part of project planning and evaluation
- Promoting the development of more integrated data management approaches and systems
- Facilitating the transfer of information and the coordination of effort across interfaces between:
 - o Science and the management system
 - o Physical sediment processes and regulatory boundaries
 - o Scientific disciplinesThis could perhaps be facilitated through an annual meeting and development of an inter-agency strategic plan
- Encouraging the development of regional strategic plans that reflect natural system boundaries.

Water and sediment quality

Major themes

Key themes that arose through the discussion and that serve to organize the specific research recommendations include the need to:

- Support TMDL development, since the implementation process is steadily moving forward without necessarily waiting for the needed science
- Focus on microbiological issues related to water quality analysis, especially detection and epidemiology. This is the most ubiquitous and visible issue, has high public interest, and is very expensive to fix. In addition, science in this area is the least well developed and there is a very large opportunity for advancing the science. There is also little overlap in this area between the Trust and what others are doing. Finally, there is a very real opportunity for California to lead the nation, since this is a uniquely California issue, with half of the beach goers and half of the coastal water quality monitoring occurring in California
- Develop new microbiological tools that identify and quantify the pathogens themselves, rather than just the traditional indicators, which don't measure pathogens directly
- Improve watershed science and our understanding of how changes in watershed features and processes affect water quality along the coast
- Promote comprehensive regional monitoring

- Improve decision-making capacity, e.g., better monitoring tools, regulatory standards and thresholds.

Short-term research needs

The individual panelists identified a number of short-term research needs. In general, these focused on the need for an improved ability to monitor pathogens directly and to link coastal water quality with the runoff from inland activities such as agriculture. Specific suggestions included:

- Promoting the transfer of microbiological technology, especially that for the detection of pathogens at the relatively low densities found in the environment, from water supply and food services industries, among others
- Developing ability to monitor multiple pathogens at one time
- Deciding on the important pathogens in coastal waters
- Determining how pesticide and nutrient runoff from agriculture affects coastal ecosystems
- Improving sediment contamination models to support TMDL development.

Longer-term research needs

The individual panelists also identified longer-term research needs, including:

- Developing the needed regulatory framework, e.g., epidemiology, standards, thresholds, for the new direct measures of pathogens in water
- Promoting the development of broader, regional genetic libraries to use with new microbiological methods. Regional libraries will be more cost effective and can help assess key questions about the needed size and stability of such libraries
- Developing custom-designed microbiological microarrays for pathogen identification and quantification
- Improving our understanding of how watershed management and changes in major watershed features, such as impervious surface area, affect water quality. For example, the cutoff points in the percentage of impervious surface area at which different kinds and amounts of significant problems occur could be identified
- Improving our knowledge of what different landuses contribute to runoff and how they compare to natural sources
- Implementing a comprehensive regional monitoring in order to attain a more complete picture of changing water quality on a statewide basis
- Adding nearshore buoys to existing offshore networks, such as those operated by Scripps Institution of Oceanography, Monterey Bay Aquarium Research Institute, and others
- Assisting institutions in crossing the gap between ocean monitoring activities and resource agencies. For example, wetlands can be managed as treatment systems or as habitat, and there are unresolved conflicts about the implications of each perspective for the other.

The role of the Trust

Panel members suggested several specific actions the Trust could take to further these research objectives and improve management related to the water quality issue. These focused primarily on promoting multidisciplinary research and developing the infrastructure needed to integrate water quality regulation and resource management. Specific suggestions included:

- Promoting multidisciplinary and multiinstitutional research
- Fostering better communication and coordination between regulatory agencies and academia
- Improving public understanding of issues
- Promoting the infrastructure needed to integrate water quality monitoring and regulation with resource management, and ensure it has the necessary science.

In addition, panelists in this group emphasized that the Trust should in general avoid direct funding of research and should instead seek to use its relatively limited resources to increase awareness, build collaboration, and search for opportunities for leverage.

Habitats and invasive species

Major themes

There were several key themes that emerged during the presentation by the panelists and in the ensuing discussion, focusing on the need to:

- Implement a routine statewide surveillance program for new invasive species
- Develop a coordinated rapid response capability to deal with high-risk invasive species
- Better understand the dynamics and overall health of coastal ecosystems
- Implement a long-term monitoring program that would track the status of ocean resources compared to their historical background
- Better educate the public about the risks posed by invasive species.

Short-term research needs

The individual panelists identified a number of short-term research needs. In general, these focused on the need for an improved ability to monitor invasive species and to respond effectively to occurrences and/or outbreaks of high-risk invasive species. Specific suggestions included:

- Establishing a statewide taskforce to manage surveillance and response. This could be modeled after an analogous network for terrestrial invasives in California, the experience of SCCAT (Southern California Caulerpa Action Team), and the New Zealand Office of Marine Biosecurity. These provide very different examples of organizational approaches to building a response capability. In addition, current legislation calls for the California Department of Fish and Game to establish a taskforce on this issue
- Finding the funding needed to establish such response network
- Working with regulatory agencies to reexamine regulations that may constrain effective responses (e.g., by prohibiting the use of toxic chemicals) to develop package of pre-approved eradication techniques
- Finding a way to effectively treat ballast water, and perhaps implement a treatment standard. Since most impacts on the benthos are due to species introduced via ballast water, this would pay large dividends
- Developing education or outreach programs that would inform the public about the threat of invasive species and the risks posed by particularly destructive ones.

Longer-term research needs

The individual panelists also identified longer-term research needs, including:

- Conducting an annual survey of all invasive species. This could be accomplished in part by coordinating existing projects
- Implementing a rapid response network to invasions, similar to the existing oil spill response network, that includes both detection and coordinated response
- Identifying key vectors for the introduction and spread of invasive species (e.g., ballast water, hull fouling, aquaculture, aquarium, bait) and quantify their impact. Then, use this as the basis of a risk analysis by habitat and organism in order to better target management actions and responses. Such a risk analysis could predict both likely locations of invasion (e.g., harbors with wide gradients of conditions) and species in order to create a watch list, but it will be difficult to predict the actual impacts of an invasion. Thus, any risk analysis would be only qualitative

- Create an entity, perhaps like the Centers for Disease Control, to periodically conduct the risk analysis
- Assessing whether exotics could be treated as a legal pollutant, since this would provide more regulatory options for dealing with them
- With regard to habitat, encouraging a greater focus on physical/biological linkages and system processes, rather than on individual resource species
- Developing the ability to identify and track long-term trends in resources, including improved understanding of past history, which is especially relevant to the issue of shifting baselines
- Implement a broad monitoring and assessment program with the ability to identify habitat resources, impacts on these, and long-term trends in their condition. This last feature is especially relevant to the issue of changing baselines. The monitoring program could be tied to the Marine Life Protection Act and other marine reserves
- Linking land use changes and runoff to impacts on nearshore water quality and habitat
- Developing management approaches that address complex systems at the scale of entire watersheds and that also reflect ocean climate changes.

The role of the Trust

Panel members suggested several specific actions the Trust could take to further these research objectives and improve management related to invasive species and habitat. These focused primarily on coordination and institution building. Specific suggestions included:

- Broadening public awareness of the magnitude of this problem. This is a case where scientific knowledge and management awareness are ahead of public perception
- Encouraging coordination among agencies with responsibilities related to invasive species
- Facilitating the design and implementation of statewide monitoring programs for invasive species surveillance and resource assessment
- Identifying and encouraging changes in existing management systems needed to manage invasive species and resources in a more coordinated way.

Fisheries management / marine protected areas

Major themes

There were two key themes that emerged during the presentation by the panelists and in the ensuing discussion, focusing on the need to:

- Improve existing stock assessment tools
- Expand monitoring networks, especially in and around marine reserves.

Short-term research needs

The individual panelists identified a number of short-term research needs. In general, these focused on the need for improved stock assessment tools and expanded monitoring networks. Specific suggestions included:

- Improving stock assessment and analysis tools, in part through:
 - o Expanding fisheries-independent stock assessment and monitoring
 - o Integrating fishery and fishery-independent data and stock size estimates
 - o Using reserves to develop empirical estimates of unfished biomass
 - o Improving the ability to measure total mortality, not just catch, including the impact of catch and release, bycatch, and discards
 - o Improving the amount, quality, and detail of information on the spatial and temporal distribution of effort and removals
- Developing ways to mitigate congestion externalities around reserves, perhaps through limited entry and flexible permit systems

- Using reserves to monitor baseline conditions and shifts in these over time
- Coordinating and expanding existing efforts to monitor nearshore systems
- Designing and implementing a monitoring program in Channel Islands to evaluate the effects of reserves. This should be used as an opportunity to involve fisheries scientists in the design of MPA monitoring programs
- Monitoring the effects of beach replenishment programs on nearshore seagrass beds which are important nursery areas
- Expanding the CRANE (Collaborative Research and Assessment of Nearshore Ecosystems) survey program by linking the diver monitoring protocol with other survey methods where no diving is possible, as for deep-water habitats
- Revisiting the 316b larval studies of the potential cumulative impact of power plant impingement on fish populations.

Longer-term research needs

The individual panelists also identified longer-term research needs, including:

- Linking stock assessment with ocean monitoring. It is not currently possible to quickly adjust management decisions to respond to the ocean environment, such as, for example, regime shifts and other ocean climate changes
- Improving economic data and econometric models for sport and commercial fisheries
- Decoupling fishery and non-fishery impacts on fish stocks
- Improving our understanding of the natural processes that drive fishery dynamics
- Creating more detailed and extensive maps of key fish habitat, especially nearshore rocky reefs, in order to better understand the role of habitat in stock assessment and to site MPAs
- Moving the fishery management system toward one based on dedicated use privileges and incentives
- Integrating marine reserves into fishery management, by, for example, developing methods to account for changes in productivity, dispersal, yields, etc.
- Involving fishermen more directly in data gathering and evaluation for fisheries management and ecosystem monitoring
- Quantifying the size and relative proportion of habitat degradation/impacts from fishing, pollution, and sediment movement
- Expanding monitoring at Channel Islands to better track the effects of the new marine reserves
- Implementing adaptive management in the MPA design and management process
- Repeating the CRANE survey, which is only scheduled to be performed once.

The role of the Trust

Panel members suggested that the role of the Trust should primarily be:

- Facilitating more effective communication and cooperation between scientists and managers
- Identifying and encouraging changes in the existing fisheries management system needed to improve stock assessment and make the system more adaptable
- Facilitating the design and implementation of expanded monitoring programs, especially to assess the performance of marine reserves.

Board of Trustees Discussion

On the morning of the second day of the workshop, the Board of Trustees discussed the information and recommendations that surfaced in the panel discussions. This discussion resulted in agreement on the next steps in developing a more detailed strategic plan for the Trust.

The Trustees began by identifying major themes that appeared to cut across most or all of the panel discussions, including the need for expanded monitoring networks, improved data management and synthesis systems, and more integrated management of resources such as fisheries. The Trustees also agreed that the Trust would maximize its effectiveness not by funding individual research projects but instead promoting new ideas, establishing working relationships between different parties, and fostering more integrated and collaborative approaches to major issues. This discussion resulted in agreement on an underlying philosophy for the next phase of the Trust's efforts, along with specific steps to begin implementing it.

Philosophy

The Trustees responded with interest to the suggestion that the Trust operate at the various interfaces between management and science and to the concept that a powerful way to change a system is by changing the ways in which one communicates with that system. The changes the Trustees agreed were needed came under the overall description of "breaking the bottleneck" and included:

- More widespread application of new technology such as remote sensing, automated monitoring, and real-time data management and analysis
- Implementing larger and more geographically integrated monitoring networks
- Working with existing research programs and institutions to facilitate better communication and enhanced cooperation among those programs/institutions
- Developing management approaches that incorporate information from new technologies and reflect improved understanding of complex ecosystem processes.

There was broad agreement among the Trustees that the time was ripe for such changes in California because of a receptive attitude within management agencies, rapid improvements in scientific capacity, the overwhelming public interest in coastal protection, and the inherent capabilities of institutions such as those represented among the Trust's Board. While there was not yet any consensus about exactly how the Trust should proceed, one suggestion advanced was that a single "poster child" project might be undertaken as an example of the Trust's approach, perhaps through development of a monitoring system for the Channel Islands marine reserves.

The Trustees also conducted a preliminary discussion of how this philosophy could be summarized in a mission or vision statement. While there was no final decision about the exact wording of such a statement, the following draft language was presented and discussed:

The Trust will encourage coordinated (e.g., multi-agency, multi-institution) approaches to ocean resource science in California. The Trust will seek to combine public resources with its own and those from the private nonprofit sectors to promote new coastal and ocean research, education, and management approaches within California. Potential focus areas could involve research or monitoring activities regarding a variety of scientific questions about coastal and ocean habitats, fisheries, water quality, and shoreline erosion.

Next steps

The Board agreed that its first product should be a strategic plan and identified the following steps in its development:

1. Delivery of the facilitator's notes from the planning workshop (this document)
2. Preparation of a five-page paper summarizing the Trust's overall philosophy and goals, which focus, not on funding individual research projects, but instead promoting new ideas, establishing working relationships between different parties, and fostering more integrated and collaborative approaches to major issues

3. Preparation of a lengthier (perhaps 25-page) paper identifying critical areas for action, describing what is at stake in each, and mapping the scientific challenges and opportunities onto the management needs in each area
4. Development of a list of specific proposals, or calls to action, for critical investments in each area.

In particular, the 25-page paper might be organized to include the following sections:

- Needs for technical and/or science-based decisions that arise from the existing management and regulatory structure. For example, it was noted that TMDLs are being implemented and that large amounts of money will be spent on TMDL-related research in the next few years, irrespective of any action by the Trust
- Data management tools required for improved monitoring, research, assessment, and decision making on broader spatial scales and across disciplinary and regulatory boundaries
- Existing scientific and technical capabilities that could produce new knowledge and provide the basis for new management approaches
- Scientific and technical information gaps that are not immediately critical but that it will be important to fill to meet longer-term management needs. This could include new methods (e.g., microbial methods for pathogen monitoring) as well as new approaches (e.g., integrating marine reserves science and fisheries management)
- Research needed to evaluate current resource management approaches. Such evaluations are necessary to help determine the directions of future research.
- Management recommendations for academic and regulatory arenas that will enable them to realize the maximum benefit from science and, where needed, to address problems from a multidisciplinary perspective.

The discussion then transitioned into a consideration of how best to produce products #2 - #4 in the above list.

Appendix 1: Panel Members

Shoreline Erosion and Sediment Transport Issues.

Scott Jenkins
UC Santa Barbara
Santa Barbara, CA 93106
(858) 534-6480
saj@coast.ucsd.edu

Lesley Ewing
CA Coastal Commission
45 Fremont St.; Suite 2000
San Francisco, CA 94105-2219
(415)904-5200
lewing@coastal.ca.gov

Paul Jenkin
Surfrider Foundation
239 W. Main St.
Ventura, CA 93001
(805) 667-2222
pjenkin@sbcglobal.net

Dr. Jim Baillard
BEACON
1150 Bailard Ave.
Carpinteria, CA 93013
jbailard@scoursystems.com

Water and Sediment Quality

Pat Conrad
UC Davis
2113 Haring Hall
1 Shields Ave.
Davis, CA 95616
(530)752-7210
paconrad@ucdavis.edu

Stephen Weisberg
Southern California Coastal Water
Research Project
7171 Fenwick Lane
Westminster, CA 92683
Phone: (714) 894-2222
steview@SCCWRP.ORG

Dr Peter Von Langen
Regional Water Quality Control Board-
Central Coast
895 Aerovista Place, Suite 101
San Luis Obispo, CA 93401
(805) 549-3333
pvonlang@rb3.swrcb.ca.gov

Habitats and Invasive Species

Linda Sheehan
The Ocean Conservancy
Pacific Regional Office
116 New Montgomery Street
San Francisco, CA 94105
Telephone: (415) 979-0900
lsheehan@oceanconservancyca.org

UC Davis
Department of Environmental Science and
Policy
1 Shields Ave.
Davis, CA 95616
530-752-9151
tedgrosholz@ucdavis.edu

Ted Grosholtz

Keith Merkel

Merkel & Associates, Inc.
5434 Ruffin Road
San Diego, CA 92123

Sonke Mastrup

California Department of Fish and Game
1416 Ninth Street
Sacramento, CA 95814
(916) 653-4673
smastrup@dfg.ca.gov

Fisheries Management/ Marine Protected Areas

Mark Carr
UC Santa Cruz
Long Marine Lab,
100 Shaffer Rd.
Santa Cruz, CA 95060
831-459-3383
carr@darwin.ucsc.edu

Patty Wolf
California Department of Fish and Game
1933 Cliff Dr., Suite 9
Santa Barbara, CA 93109
PWolf@dfg.ca.gov

Rod Fujita
Environmental Defense
5655 College Ave; Suite 304
Oakland, CA 94618
510-658-8008
rfujita@environmentaldefense.org

Chris Hoeflinger
Fisherman
197 Timber Rd.
Newbury Park, CA 91320
(805) 498-9343
rhoeflinge@aol.com